

City of Sydney Decentralised Energy Master Plan

Overview

The City of Sydney's Decentralised Energy Master Plan is one of five master plans being developed as part of a Green Infrastructure Plan for the City. These master plans will articulate the implementation strategies that will ultimately deliver the vision set out in Sustainable Sydney 2030. Sustainable Sydney 2030 sets in place a range of targets and ambitions to reduce the city's greenhouse gas emissions, reduce potable water consumption, improve waste management practices and work towards a sustainable transport system.

The Decentralised Energy Master Plan is the first of these five master plans to be prepared, and sets out a plan to significantly reconfigure the way energy is generated, transported and used within the City of Sydney. The focus of the Master Plan is to facilitate the uptake of trigeneration, a technology that enables local production of electricity at high efficiency, while capturing and utilising the waste heat generated by this process for heating, hot water or cooling (via absorption chilling). While generally reliant on natural gas as its primary fuel, there is potential for trigeneration to be powered by bio-fuels, wood chips or organic waste. See page two for a graphical representation of this technology.

The plan places a strong emphasis on ensuring that both new and existing buildings can become a part of a decentralised energy network in the city. It also recognises the importance of looking beyond individual building systems, and instead seeking precinct-scale opportunities where the different energy demand profiles of various buildings and land uses can be matched to establish an efficient and economically viable network.

Sustainability focus: decarbonising the energy supply

Trigeneration and decentralised energy

With increasing awareness of the significant contribution Australia's traditional, centralised forms of electricity generation make to greenhouse gas emissions, technologies like trigeneration are looked to as part of an alternative, decentralised system. A decentralised approach to energy places generation capacity closer to its end users. Supply is provided by a large number of small generators, potentially combining a mixture of renewable and non-renewable systems. It also often deploys technologies that are more responsive, like trigeneration, allowing supply to fluctuate in response to demand.

This is a fundamental shift from the current system, which is slow to respond to shifts in demand, and must transport electricity over large distances. This results in transmission losses, along with a distribution network which is sized to meet the peak demand of a small number of days each year.

The efficiency of trigeneration is due to a number of factors, including:

- lower emission intensity fuel (natural gas) when compared to black or brown coal;
- lower transmission losses, through location close to end use;
- productive use of waste energy, through utilisation of heat for domestic hot water, space heating or cooling (via absorption chilling);
- greater responsiveness.

Land use implications

While there is strong potential for trigeneration and other decentralised energy technologies to facilitate the decarbonisation of energy supply, the right technologies must be matched to the right land uses. Commercially viable decentralised energy plants must be sized and located to suit the demand profile of the end uses. The thermal demand - for heating and cooling - is particularly important, as a well aligned demand for this energy can be critical to establishing a sound business case. As part of the Master Plan, the City of Sydney have mapped these key elements of demand across the municipality, highlighting those buildings and precincts with the greatest potential to support a viable system.

Government support

The Decentralised Energy Master Plan has been funded by the City of Sydney which has taken on a leadership role in demonstrating a pathway to a decarbonised future energy system. As the plan progresses the City will continue to lead by example, through linking its own facilities to local low-carbon energy systems and working with the private sector to encourage broader uptake.

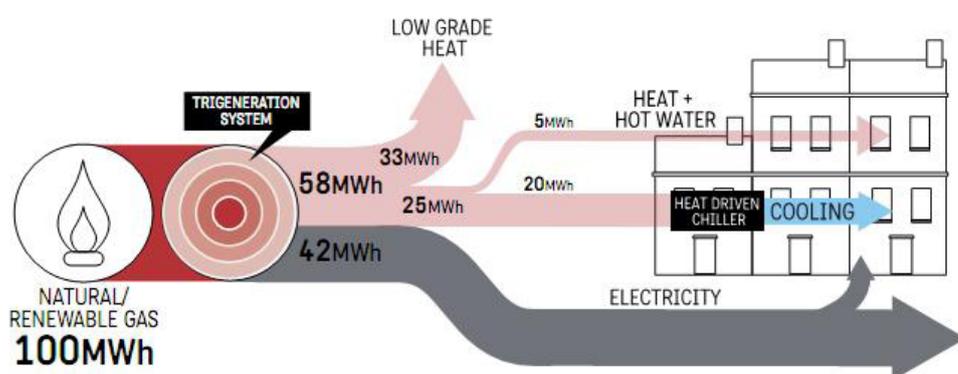


Image credit: City of Sydney Decentralised Energy Master Plan

Implications for planners

Planning policy to recognise decentralised energy

The Master Plan identifies fifteen enabling actions to support the successful implementation of the plan, including changes to the regulatory environment for development within the plan's 'low carbon zones'. This includes proposed changes to BASIX, to lift greenhouse gas compliance targets significantly for buildings within these zones, to encourage developments to link into the network. Planners working within these areas would need to be upskilled to enable these changes to be efficiently implemented.

Decentralised energy and other land uses

As decentralised energy infrastructure is deployed, planners will be a part of managing the impact of this technology on other land uses. This could include health, amenity and urban design considerations.

Connection to Clean Energy Future package

The Sydney Decentralised Energy Master Plan has the potential to cause significant change in the way energy is generated and distributed in the City of Sydney. The Clean Energy Future Package has the potential to support and influence this change substantially.



Carbon price mechanism (CPM)

As the CPM continues to influence the costs of energy, decentralised energy has the potential to become increasingly attractive. While the CPM forms a small proportion of energy cost increase at present, it has the potential over time to highlight the advantages of low-emission technologies such as trigeneration.



Renewable and low carbon energy (RLCE)

The RLCE components of the package may be directly linked to the implementation of the Sydney Decentralised Energy Master Plan. Both the funds available for R&D and the potential for investment via the Clean Energy Finance Corporation could contribute to the realisation of the plan.



Energy efficiency (EE)

At its core the aim of the Master Plan is to improve the efficiency of energy generation and distribution. There is potential for the Low Carbon Communities fund to support local government or community projects within the geographic area of the Master Plan.

Further reading

- City of Sydney Website:

<http://www.cityofsydney.nsw.gov.au/council/onexhibition/TrigenerationMasterPlan.asp>